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WEAPON SYSTEM 133B  
PROGRAM PROGRESS  
RESEARCH AND DEVELOPMENT  
STAGE I MINUTEMAN

1 JAN THRU 31 MAR 1967



**Thiokol**  
CHEMICAL CORPORATION  
WASATCH DIVISION

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⑨ Contract Status Report. 1 Jan - 31 Mar 67.

Wasatch Division Report  
No. 0717-62-0848

⑥ WEAPON SYSTEM 138B.

PROGRAM PROGRESS  
RESEARCH AND DEVELOPMENT  
STAGE I MINUTEMAN.

1 Jan thru 31 Mar 1967

⑪ 31 Mar 67

Prepared by

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## FOREWORD

This program progress report of the research and development effort on Stage I MINUTEMAN motors for the period 1 Jan thru 31 Mar 1967 was prepared in compliance with Contract AF 04(694)-271, and with United States Air Force Ballistic Missile and Military Space Systems Contractor Reports Exhibit 58-1.

Each project is identified by the CCN upon which it is based. Projects completed before the subject quarter, or as yet unreleased, are not discussed in this document. Reporting of administrative effort is "reporting by exception." Technical effort reported in this document is primarily "status reporting."

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\*CCN-61, -63 thru -67, -78 thru -85, and -100

**DESIGN AND FABRICATION OF CONSOLES FOR SAFETY  
VERIFICATION TESTING  
(CCN-70, Project 17105)**

BSD, through the local AFPRO, has been sent a complete package consisting of electrical schematics, operating manuals, and drawings for review and subsequent approval. Changes are being made to incorporate Air Force suggestions received to date. Fabrication of the remaining two consoles will be completed after final approval is received by Thiokol.

**NUCLEAR HARDNESS STUDY  
(CCN-54, Project 17116)**

Physical property testing of the first irradiated specimens were completed and an interim report, TWR-2303, was released on 15 Jan 1967. The second irradiation specimens are scheduled to be prepared and shipped to Lockheed in August. The test is planned for November 1967.

**SAFETY AND ARMING DEVICE VERIFICATION AND VALIDATION  
(CCN-60, Project 17117)**

During this report period, the Safety and Arming Device Verification and Validation Program Plan was updated and submitted to BSD. This plan was technically approved excepting the schedule, for which CCN approval is required. The schedule will be updated and coordinated with BSD/OOAMA after all outstanding Figure A's are placed on contract for design, fabrication, or analysis. The Figure A's requiring action are 150.6A, 165.6A, 17580.6A, 17583.6A, and 17586.6A.

**MODIFICATION OF SPECIAL TEST MOTORS FOR OOAMA  
(CCN-96, Project 17119)**

This project was established in December 1966 to rework three motors. The Avcoat is to be removed from 46 forward skirt holes to make the motors compatible with the special test program. Two motors were reworked and returned to AF Plant 77 on 12 and 27 Jan 1967. The third motor was of the 1U32300-20 configuration and thus did not require modification. This project is now completed.

**RIP NOZZLE VERIFICATION AND VALIDATION  
(CCN-87, Project 17120)**

The existing aft closure mockup, which was used in the Wing II-V Nozzle Verification and Validation Program, has been modified for compatibility with the RIP nozzle configuration. OOAMA is in the process of sending 14 Figure A items to Thiokol as GFP to support the Thiokol inhouse portion of this program. These 14 items are scheduled to be available to Thiokol in April 1967. The remaining DMGE to support this program is scheduled to be available by late April or early May 1967.

**FABRICATION OF MINUTEMAN III STAGE I MOTORS (GTM's)  
(CCN-93, Project 17121)**

This project was established to fabricate and deliver four Stage I motors according to the following schedule.

| <u>GTM</u> | <u>Delivery</u> |
|------------|-----------------|
| 070        | June 1967       |
| 071        | September 1967  |
| 072        | February 1968   |
| 073        | February 1968   |

The cost proposal and program plan were submitted to PCD on 31 Mar 1967. Thiokol supported the Technical Interchange Meeting on 15 February and the Instrumentation and In-process Design Review Meetings on 21 and 22 March 1967. All of these meetings were held at Boeing, Seattle.

Air Force approval was received to use fired cases and closures for this program.

The technical evaluation of MINUTEMAN III Criteria Documents is complete except for the Nuclear effects study. A subcontract is being prepared to accomplish this effort.

#### PLANNING, DOCUMENTATION, AND CONTROL

##### VALUE ENGINEERING (Project 17171)

The value engineering program status for this quarter is tabulated below.

| <u>Project</u> | <u>Title</u>  | <u>Class</u> | <u>Estimated Savings (\$)</u> | <u>Status</u>   |
|----------------|---|--------------|-------------------------------|---|
| 64-8           | Recycle used operational pressure transducers from quality assurance firings      | I            |                               | Dropped--analysis of reusing only CEC units indicates no cost savings to the program. |
| 66-2           | Eliminate case center weld  | I            | 233,900                       | Implemented for production  |
| 67-1           | Weigh only one igniter from each lot instead of weighing each individual igniter. | II           | 126 per year                  | Implemented   |
| 67-2           | Eliminate Motor Log Book and add data to form DD250                               | I            |                               | In study  |
| 67-3           | Reduce number of standardizations required by increasing material lot size        | I            |                               | In study  |
| 67-4           | Reclaim Wing II-V case-closure parts for use in new Wing VI motors.               | I            |                               | In study  |



## **SAFETY AND ARMING DEVICE REDESIGN AND TESTING**

### **INTERCHANGEABILITY (CCN-86, Project 17172)**

This effort was completed during the current report period.

### **KR80000-09 VERIFICATION TESTING (CCN-86, Project 17172)**

Twelve KR80000-09 safety and arming devices are presently undergoing verification testing in accordance with Thiokol Test Plan TWR-2109 to determine conformance with the devices with BSD 62-64A requirements.

Testing of the ES-003 squibs will begin upon approval of the next lot from the vendor. Anticipated delivery of this lot shall be on or before 1 May 1967.

### **SPECIAL TOOLS (CCN-77, Project 17180)**

The six special tools are currently scheduled to be available for engineering checkout by early April, 1967. These tools will be used by OOAMA for modifying the KR80000-07 safety and arming device to the KR80000-09 configuration.

## **DEPOT MGE, WING VI**

### **PROJECT 17104**

Preparation of ECP's WS-133B-THB259, -B260, and -B261 was completed for Figure A's 17583.6A, 17585.6A, and 17586.6A. An ECP is currently in process for Figure A 17580.6A.

### **PROJECT 17173**

CCN-61, -63 thru -67, and -78 thru -85

Problems associated with approval of DMGE specifications and qualification test supplements were resolved. All specifications and applicable qualification test

supplements are scheduled to be forwarded to BSD/TRW for final approval on or before 15 Apr 1967.

#### CCN-61

Air Force acceptance tests for Figure A 17549.6A are scheduled to be completed during April 1967. Upon completion of these tests, the nozzle torque and deflection prototype will be delivered to the Air Force and subsequently used by Thiokol to support the Nozzle Verification and Validation Program.

#### CCN-100

This CCN, received during March 1967, involves the engineering design effort for Figure A 17565.6A, Inspection Gage, Nozzle Insert Seal. Design review (PDR/CDR) is scheduled for May, 1967.

### **LOGISTICS SUPPORT** (CCN-37, -46, and -89, Project 17176)

#### **R & D AGE (Task 01)**

A continuing analysis was maintained for Wing VI R & D AGE requirements at ETR.

#### **SYSTEM REQUIREMENTS ANALYSIS (Task 03)**

Finalization of the system requirements analysis baseline has been delayed pending release of the supplemental agreement for incorporation in the analysis documentation of all OOAMA solutions to Thiokol recommended Figure A's.

#### **R & D SPARES FOR ETR (Task 04)**

A priced spare parts list was prepared in accordance with the MCPT 55-25 document. Partial spares hardware deliveries were made during March 1967. Additional spares hardware is scheduled for delivery during April 1967.

**FLIGHT TEST**  
(CCN-59, Project 17178)

The following flight tests were conducted during this quarter:

| <u>FTM</u>    | <u>Missile Configuration</u> | <u>Test Date</u> | <u>Stage I Results</u> |
|---------------|------------------------------|------------------|------------------------|
| <b>AFETR:</b> |                              |                  |                        |
| 464           | Wing VI                      | 17 Jan 67        | Successful             |
| 465           | Wing VI                      | 24 Feb 67        | Successful             |
| <b>VAFB:</b>  |                              |                  |                        |
| 2073          | Wing VI                      | 11 Jan 67        | Successful             |
| 828           | Wing II FOOT                 | 24 Jan 67        | Successful             |
| 1206          | Wing V FOOT                  | 30 Jan 67        | Successful             |
| 2087          | Wing VI                      | 2 Feb 67         | Successful             |
| 893           | Wing III FOOT                | 7 Feb 67         | Successful             |
| 1263          | Wing V BOT                   | 21 Feb 67        | Successful             |
| 700           | Wing III FOOT                | 21 Feb 67        | Successful             |
| 725           | Wing II FOOT                 | 7 Mar 67         | Successful             |
| 1253          | Wing II FOOT                 | 22 Mar 67        | Successful             |

**CASE DISSECTION OF STAGE I MOTOR, STM-012**  
(CCN-73, Project 17558)

Motor dissection and laboratory testing were completed during this quarter. Thiokol Document TWR-2274, Final Report, MINUTEMAN Surveillance Motor Dissection Program, will be published in April 1967.

**STORAGE OF MINUTEMAN MISSILE-MOTOR SETS FOR OOAMA**  
(CCN-98 and -105, Project 17701)

CCN-98 authorized storage of up to ten missile-motor sets for up to three months. Four sets were received last quarter and six this quarter. One set was returned to AF Plant 77 for use in the STM program leaving nine motor sets in storage at the end of the quarter.

By authority of CCN-105, the storage period was extended through 30 Jun 1967 and ten additional Stage I motors were scheduled for storage.

**MOTOR SURVEILLANCE RELIABILITY IMPROVEMENT PROGRAM**  
(CCN-95, Projects 17801 thru 17804)

The status and technical report for this quarter is reported in Thiokol Document TWR-2372, MINUTEMAN Stage I Motor Reliability Improvement Program, Surveillance Quarterly Report.